

SECRETNPIC/TSSG/DED-1642-69
3 June 1969

MEMORANDUM FOR THE RECORD

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SUBJECT: [] ry Silver Evaluation Memorandum of 9 May 1969

1. The following memorandum is in response to the dry-silver "evaluation" written by [], one of our student co-op employees. [] produced a very excellent report which is quite detailed and inclusive and indicates that he spent a considerable amount of time on the report. However, some of the basic data and conclusions are erroneous. It is felt by the undersigned that these should be corrected in order to produce a more accurate understanding of the dry-silver materials and equipment situation.

2. Basically, and first of all, it should be pointed out that dry-silver materials development is in two stages at the same time: (1) NPIC is supporting basic research on dry-silver materials in order to advance the state-of-the-art of this new process to achieve the goals established by NPIC personnel, (2) the [] is in the process of building, checking-out, modifying, and improving a special coater using solvents and plastics instead of water based emulsions. This effort is aimed at scaling-up production from formulations proven in the research laboratory. This dual approach was taken in order to shorten the time between the final achieving of goals in the laboratory and the production of the material in a limited quantity and quality. This situation could account for some of the confusion. Extensive sensitometric testing is a waste of time until scale-up and production problems are solved!

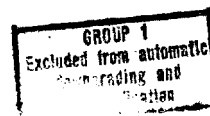
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3. Specific discrepancies and areas of confusion are answered as follows:

- I. 1. (a) The situation of "high gamma" vs "low gamma" is not one "development to completion", even though there is obviously more exposure and more development at high gammas, the same as for wet silver processes. In wet processing, solution concentration, replenishment, agitation, temperature, time, etc. are highly controlled, critical factors. Dry heat processing is also more critical and difficult for low gamma conditions. As a matter of fact, special films are used for extremely low gamma processing for conventional wet processing and these have their special problems of mottle, control, etc. (b) Spectral sensitivity curves are already available for most dry-silver formulations.

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2. Resolution in excess of 1800 l/mm have been measured at the testing facilities. has been using a camera patterned after the U.S. Bureau of Standards for the last three years of this testing. At the present time, work is about completed on a laser-interferometer method of resolution testing this high resolution material.

3,4,5 - see paragraph 2 above.

6. Both heat and light effect the stability of dry-silver image. Data is available as to what degree of each separately, or in combination, effects image stability. These changes are minimal under standard controlled conditions as found at NFIC.

7. The only known techniques for applying interference coatings is by highly controlled vapor deposit, a technique out of the question for knife or transfer coating. It should be noted that a spray solution for completely stabilizing dry-silver prints is available. However, it is a goal to have all of the required chemistry within the original material, with only heat required for both processing and fixing.

8. Basic resolution, MTF, and granularity information is available at the present time. As the various goals are achieved, additional tests are performed.

- II. 1. Since dry-silver processing is a heating process, and since photographic grade polyester is formed under tension, any heating after formation will cause relaxation. Investigation is now underway to "pre-shrink" or "relax" this material prior to coating in order to keep the dimensional stability within bounds.

Since all photographic bases experience a dimensional change during high speed machine processing (not tray processing), the question is - what is an acceptable limit to dimensional change! Efforts are underway by the undersigned to obtain information on what sort of changes occur, under standard high speed, bath, spray, and viscose processing conditions, using both normal and high temperature developers. Of course the effect of the drying is also included.

2. All forms of heat processing, including micro-wave radiation have been investigated and/or tried as a possible method of processing dry-silver materials. Micro-wave radiation is much too gross and difficult to control to be used for this process. As a matter of fact, it was found to be too gross for even drying conventional wet processed material!

-2-

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25X1 SUBJECT: [] Dry Silver Evaluation Memorandum of 9 May 1969

3. The problem of contamination by paper production by-products was a temporary problem with Diazo paper materials not dry-silver.

This problem has been satisfactorily solved by coating the back of the paper with a transparent plastic.

25X1 III. A. [] observations in this area are quite correct. As soon as a sheet processor is developed this use will be exploited.

B. Again, there is agreement with [] observations. It is felt that either a "chinese copy" of the U.S. Navy's Reader/Printer or a modification of this item would be of great use to AIS as well as IEG. It is also expected that heat processed Diazo will replace the ammonia chip processors.

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